

Explicit threshold of the toroidal ion temperature gradient mode instability

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The explicit stability threshold of the toroidal ion temperature gradient mode instability is analytically derived using the standard reactive fluid model. It is shown that in the peak density region, the threshold gets significant smaller due to finite ion Larmor radius effects, and the marginal unstable modes acquire finite wavelengths. These results predict that a significant activity of toroidal ITG turbulence can be present at regions of peaked plasma density, such as the plasma edge, modifying the confinement in the hot ion mode regime of tokamak operation.

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